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Case Number: T 1628/07 - 3.3.10

Application Number: 04713108.1

Publication Number: 1599234

IPC: A61L 2/10

Language of the proceedings: EN

Title of invention:
A device for sterilising a fluid

Patentee:
Helmore, Ian Stewart, et al

Opponent:
-

Headword:
Device for sterilising a flow of water/Helmore

Relevant legal provisions:
EPC Art. 123(2), 54, 56

Relevant legal provisions (EPC 1973):
-

Keyword:
"Added subject-matter (no)"
"Novelty (yes)"
"Inventive step (yes) - improvement - not obvious"

Decisions cited:
-

Catchword:
-

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Case Number: T 1628/07 - 3.3.10

D E C I S I O N
of the Technical Board of Appeal 3.3.10
of 4 May 2010

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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 2 May 2007 refusing European application No. 04713108.1 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: R. Freimuth
Members: C. Komenda
D. S. Rogers

Summary of Facts and Submissions

I. The appeal lies from the decision of the Examining Division posted on 2 May 2007 refusing European patent application No. 04 713 108.1 published with the International publication No. WO 2004/073754.

II. In the decision under appeal, the Examining division referred to the following documents:

(1) GB-A-2 175 777,
(2) WO-A-00 78 366,
(3) DE-A-101 57 355,
(4) US-A-5 393 419,
(5) WO-A-97 309 38 and
(6) US-B-6 497 840.

The decision under appeal found that the subject-matter of the patent according to the then pending main request and auxiliary request 1 did not involve an inventive step, when starting from document (2) as closest state of the art. Auxiliary requests 2 to 11 were regarded as not meeting the requirements of Article 84 EPC.

III. In a written communication dated 19 November 2009 the Board indicated that *inter alia* the subject-matter of those claims relating to a device for sterilising "a flow of liquid" may extend beyond the content of the application as filed, contrary to the requirement of Article 123(2) EPC.

IV. At the Oral proceedings held on 4 May 2010 before the Board the Appellant filed a sole request, independent claim 1 of which read as follows:

"1. A device (2,26,44) for sterilising a flow of water, the device comprising an inlet (6, 30) through which the water enters the device, a source of ultraviolet radiation (18), and a sterilisation zone (4, 28, 56) having an outlet portion (10, 32, 58) comprising a shower head (48) which comprises at least one aperture (16, 34) through which the water exits the device (2, 26, 44), wherein the sterilisation zone (4, 28, 56) is arranged to be irradiated by the source of ultraviolet radiation (18) such that all of the internal surfaces of the outlet portion (10, 32, 58) are directly irradiated by the source of ultraviolet radiation (18) characterised in that the source of ultraviolet radiation (18) and the at least one aperture (16, 34) are arranged such that no ultraviolet radiation is transmitted directly from the source of ultraviolet radiation (18) through the at least one aperture (16, 34) of the shower head (48)."

V. With its statement of the Grounds for appeal dated 10 September 2007 the Appellant argued that starting from document (2) as closest prior art the skilled man would not have had any incentive to increase the safety of the device by arranging the source of ultraviolet radiation and the apertures in a manner such that no ultraviolet radiation was directly transmitted through the apertures, while maintaining all internal surfaces of the outlet portion directly irradiated by the source of ultraviolet radiation. As to the amendments made, the Appellant submitted that the whole application is

directed to devices used to sterilise water for a shower. All the figures comprised a shower head and related to a flow of water. From figures 1, 2, 3 and from the description page 5, lines 25 to 27 the skilled man would have directly derived that all internal surfaces of the outlet portion were directly irradiated by the source of ultraviolet radiation. The inner walls of the apertures did not form part of the internal surface of the outlet portion, as the aperture merely represented a void area within the internal surface of the outlet portion. The inner wall of the apertures could also be defined as being part of the outer surface of the device and did, therefore, neither clearly belong to the internal surface of the outlet portion, nor to the outer surface of the device.

VI. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 14 of its main request submitted during the oral proceedings before the Board.

VII. At the end of the oral proceedings the decision of the Board was announced.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments (Article 123(2) EPC)*

2.1 Independent claim 1 as amended is now directed to a device for sterilising a "flow of water" instead of a device for sterilising a "fluid". This amendment is

based on all of the figures of the application as filed, with figure 3 being an enlarged view of the outlet portion of figure 2 and figure 5 corresponding to the device of figure 4 with its front lid open. The reference to a flow of water is to be found in the description of these figures on page 5, lines 1, 2, 6 and 10 and page 6, lines 8 and 16 relating to figure 1, on page 6, line 35 and page 7, lines 1 and 2 describing the situation where the device remains full of water when it is not operating, i.e. when water is not flowing through the device as shown in figures 2 and 3, and on page 10, line 5 to 6 relating to figures 4 and 5.

Thus, this amendment fulfils the requirements of Article 123(2) EPC.

2.2 A further amendment made to claim 1 resides in that claim 1 specifically comprises "a source of ultraviolet radiation (18)", which is based on the wording of original claim 1.

2.3 According to a further amendment claim 1 is now relating to a device comprising "a shower head (48)". This amendment is based on original claim 5, which refers back to original claim 1.

2.4 Further, claim 1 has been amended as to comprise "an inlet (6, 30) through which the water enters the device". This feature is to be found on page 4, line 12 in relation to figure 1, on page 6, lines 31 and 35 relating to figures 2 and 3 and on page 8, line 26 relating to figures 4 and 5. As this feature is to be found in all of the figures, this amendment fulfils the requirement of Article 123(2) EPC.

2.5 Independent claim 1 has further been amended by omitting the term "substantially" at two occurrences.

2.5.1 The deletion at the first occurrence of the term "substantially" results in the arrangement of the source of ultraviolet radiation within the sterilisation zone being such that all internal surfaces of the outlet portion are directly irradiated by the source of ultraviolet radiation, whereas according to the original wording merely substantially all internal surfaces were directly irradiated. Basis for this amendment is to be found in figures 1, 2 and 3:

Figure 1 comprises two embodiments, wherein the first one relates to the ultraviolet lamp being constantly switched on to irradiate "the inner surfaces of the device" (page 6, line 7) and the second embodiment relates to the situation where the ultraviolet lamp is only activated when there is a flow of water. In this latter case the embodiment benefits from "the complete sterilisation of the inner surfaces", which may only be achieved by irradiation of all the inner surfaces of the whole device, thus including all internal surfaces of the outlet portion.

With regard to figures 2 and 3 the description indicates on page 7, line 14 that substantially all internal surfaces of the outlet portion were directly radiated. However, the drawings of figures 2 and 3 directly and unambiguously reveal by drawn lines indicating the paths of the ultraviolet rays that due to the shape of the outlet portion and the arrangement of the ultraviolet lamp within the sterilisation zone

all of the internal surfaces of the outlet portion are directly irradiated by the ultraviolet lamp without creating any shadowed areas. Therefore, figure 2 and in particular figure 3 convey to the skilled person the only technical sense that all internal surfaces of the outlet portion are directly irradiated.

2.5.2 The deletion of the second occurrence of the term "substantially" results in the arrangement of the source of ultraviolet radiation and the at least one aperture being such that no ultraviolet radiation is transmitted directly through the aperture. Basis for this amendment is to be found in figures 1, 2 and 3 of the application as filed and on page 6, lines 22 to 24, on page 7, lines 15 to 16, 24 to 25, 30 to 31 and 33 to 35.

Therefore, both omissions of the term "substantially" do not contravene Article 123(2) EPC.

2.6 Further, claim 1 has been amended by deleting the term "may" at two occurrences.

The first deletion results in the amendment that water no longer "may exit" but "exits" the device. Since the original wording "may exit" has the meaning "optionally exits", the deletion of the term "may" corresponds to the deletion of the term "optionally", which is not to be objected to under Article 123(2) EPC.

The second deletion of the term "may" modifying the expression "no ultraviolet radiation may be transmitted" into the expression "no ultraviolet

radiation is transmitted" does not alter the technical meaning, but clarifies the absence of any transmission.

Therefore, these amendments to claim 1 are not to be objected to under Article 123(2) EPC.

2.7 For the combination of the features of amended claim 1 with the mandatory presence of a shower head the basis is to be found in the application as filed, which generally relates to a device for providing sterile water for a shower (page 3, line 33). All the figures of the application as filed relate to shower units through which water is flowing and which comprise a water inlet and a shower head (page 4, line 22, page 8, lines 2, 6, 24, 25, 33, 34 and 35). The application as filed does not address any device being used for other purposes than for providing sterile water for a shower, wherein a flow of water is sterilised by directly irradiating all internal surfaces of the outlet portion without any ultraviolet radiation escaping from the device. Therefore, the application as filed provides an adequate basis for the amendments made.

2.8 All the amendments made to claim 1, therefore, fulfil the requirements of Article 123(2) EPC.

3. *Novelty (Article 54 EPC)*

During the examination procedure novelty has been challenged in view of document (1) only. Document (1) discloses a device for the sterilisation of water. The device according to Figure I/I comprises a water inlet (26), a sterilisation zone (4), a ultraviolet lamp as a source of ultraviolet radiation (10) and an outlet

portion comprising one aperture (14) through which the water exits the device.
The source of ultraviolet radiation in figure I/I is an ultraviolet lamp (10). As depicted in figure I/I the ultraviolet lamp consists of a U-shaped glass tube, which is arranged within the sterilisation zone (4) such that the ends of the glass tube are connected by the socket (20) at the base of the sterilisation zone with the arc-shaped tube (10) extending into the sterilisation zone almost up to the quartz thimble (16), which surrounds the ultraviolet lamp. The small elongated zone enclosed by the bent glass tube of the ultraviolet lamp represents a void space, which does not form part of the ultraviolet lamp and which, consequently, cannot be the source of the ultraviolet radiation contrary to the findings of the first instance in the decision under appeal. At the oral proceedings before the Board the Appellant submitted Figure I/I, which included various paths of ultraviolet radiation emitted from the outer limit of the ultraviolet lamp (10). The various paths show that ultraviolet radiation is directly transmitted from the ultraviolet lamp through the aperture (14). At the same time it is demonstrated that with the arrangement of the ultraviolet lamp and the aperture (14) of Figure I/I it is not possible to irradiate all internal surfaces of the outlet portion (14), as the various paths always create a shadowed area within the outlet portion.

Since document (1) does not disclose a device, wherein the source of ultraviolet radiation and the aperture are arranged in a way such that all of the internal surfaces of the outlet portion are directly irradiated

by the source of ultraviolet radiation and whereby no ultraviolet radiation is transmitted directly through the aperture, the subject-matter of claim 1 is novel in the sense of Article 54 EPC.

4. *Inventive step (Article 56 EPC)*

4.1 For the assessment of inventive step in accordance with the problem-solution approach, it is necessary to establish which document represents the closest prior art in order to determine in the light thereof the technical problem which the invention addresses and solves. The closest prior art is normally represented by a prior art document disclosing subject-matter aiming at the same objective as the claimed invention and having the most relevant technical features in common.

4.2 The patent in suit is directed to a device for sterilising a flow of water in a shower. Such a device already belongs to the state of the art as illustrated by document (2), which relates to a shower head for sterilising water. This document was considered in the decision under appeal and by the Appellant as representing the closest prior art document for the assessment of inventive step. The Board sees no reason to depart from this finding.

4.3 Document (2) relates to a shower head for sterilising water. In particular Figure 2 discloses a shower head provided with an ultraviolet lamp (2) extending from the handle into the outlet portion of the shower head. With this arrangement all internal surfaces of the outlet portion are directly irradiated by the

ultraviolet lamp leaving no hidden volume in which the bacteria or other organisms may develop and be released when the shower is used (page 5, lines 3 to 5). However, this document is silent on whether or not ultraviolet rays are directly transmitted through the apertures in the spray nozzle (11).

4.4 Having regard to this prior art document, the Appellant submitted that the technical problem underlying the patent in suit was to provide a shower device with improved safety for the user. In this respect it has to be noted that the safety for the user of the shower device for sterilising water is related to the aspects of preventing the user from being harmed by ultraviolet radiation escaping from the device, and of preventing the user from being harmed by incomplete sterilisation of the water, the latter of which is already achieved in the device of the closest prior art (see paragraph 4.3 *supra*).

4.5 As a solution to this problem the patent in suit proposes the device according to claim 1, which is characterised in that the source of ultraviolet radiation and the at least one aperture are arranged such that no ultraviolet radiation is transmitted directly from the source of ultraviolet radiation through the at least one aperture of the shower head. The solution proposed in claim 1 is not defined in purely functional terms, which is that no ultraviolet radiation is transmitted directly from the source of ultraviolet radiation through the at least one aperture, but contains also a constructional element, giving the skilled person instructions on the technical measures to be taken in order to fulfil the functional

definition. The constructional element in the proposed solution is that the geometrical arrangement of the source of ultraviolet radiation and the position and shape of the apertures have to be adjusted in order to fulfil the functional part of the solution, which is that no ultraviolet radiation is transmitted directly from the source of ultraviolet radiation through the at least one aperture.

4.6 The figures 1, 2 and 3 of the application in suit, in particular figure 3, which is an enlarged view of the upper portion of the device of figure 2, demonstrate by drawn lines indicating the paths of the ultraviolet rays that the device according to claim 1 achieves a complete sterilisation of the water, while no harmful ultraviolet radiation escapes from the device in use. Therefore, an improvement concerning the safety of the device known from document (2) is credible. Consequently, the Board is satisfied that the problem underlying the invention has been successfully solved.

4.7 Finally, it remains to be decided whether or not the proposed solution to the technical problem, namely no ultraviolet radiation escaping from the device due to a particular arrangement of the source of ultraviolet radiation and the at least one aperture, is obvious in view of the state of the art.

4.8 Document (6) tries to solve the same problem as the application in suit, which is avoiding that ultraviolet radiation escapes from the device (column 8, lines 49 to 51, claim 1). The solution proposed in document (6), however, resides in the provision of baffles in the outlet portion in order to prevent ultraviolet

radiation from escaping through the apertures. This solution has the drawback of creating shadowed areas within the outlet portion. The incomplete irradiation of the internal surfaces of the outlet portion leads to recontamination problems, and as a consequence to a degradation of the sterilisation effectiveness. Therefore, the skilled person would not consider the solution proposed in document (6) for improving the safety of the device, since only an improved safety with regard to harmful ultraviolet radiation escaping from the device is achieved, whereas the recontamination of the outlet portion would impair the safety of the device with regard to its sterilisation effectiveness.

Document (1) does not address the above mentioned technical problem (see paragraph 4.4 *supra*). As demonstrated in Figure I/I, submitted by the Appellant during the oral proceedings before the Board, there is ultraviolet radiation directly transmitted from the ultraviolet lamp through the aperture. Consequently, the skilled man would not consider document (1) when looking for a device with improved safety.

Document (3) relates to a shower unit provided with an external source of ultraviolet radiation, which does not directly irradiate the internal surfaces of the device. Although no ultraviolet radiation is directly transmitted through the apertures of the shower head, which renders the device safer for the user, the person skilled in the art would also recognize that not all internal surfaces of the outlet portion are directly irradiated by the source of ultraviolet radiation. As this results in recontamination of the device and,

consequently, a reduction in safety with regard to the sterilisation effectiveness the skilled person would not have considered the solution proposed in document (3).

Document (4) relates to a device for sterilising water, without direct transmission of ultraviolet radiation from the source of ultraviolet radiation through the outlet of the device. As, however, not all internal surfaces of the outlet portion are directly irradiated the solution proposed in document (4) suffers from the same drawback concerning recontamination as that of document (3). Therefore, a skilled person would not have considered the solution proposed in document (4) for solving the technical problem underlying the invention.

Document (5) relates to a device for sterilising water, but gives very general information only. Therefore, a skilled person cannot derive any teaching from this document that could lead him to the solution as proposed in the application in suit.

4.9 To summarize, in the Board's judgement document (2) taken in combination with either of documents (1) or (3) to (6) does not render the claimed invention obvious.

4.10 For these reasons, the Board concludes that the subject-matter of claim 1 and by the same token that of dependent claims 2 to 14, which include all the features of claim 1, involves an inventive step within the meaning of Article 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to grant a patent on basis of claims 1 to 14 according to the main request as submitted during the oral proceedings before the Board and a description and drawings yet to be adapted.

The Registrar | The Chairman

C. Rodríguez Rodríguez | R. Freimuth